



OO/UC3M/21 - EFFICIENT METHOD TO DETECT AND CORRECT ERRORS CAUSED BY RADIATION ON DIGITAL FILTERS

University Carlos III of Madrid in collaboration with University Antonio de Nebrija has developed a technique to protect digital filter implementations, frequently used in communications and signal processing against the errors caused by radiation. This solution provides both an effective protection against radiation and a competitive implementation cost in terms of area and power, those results in substantial cost savings when compared with traditional techniques such as Triple Modular Redundancy (TMR).

Description of the technology

The techniques proposed in this offer enable the use of recursive structures to implement moving average filters that are tolerant to radiation effects. The recursive structure is by nature more efficient than the non recursive one with our proposed techniques can be used without tripling the registers as it would be the case in TMR.

To provide protection one of the proposed techniques uses a two dimensional set of parity bits that enable the detection and correction of an error caused by radiation.

This technique can also be used to protect generic finite impulse response (FIR) filters and in both cases it results in a lower increment in the number of logic gates needed to implement the filter than for TMR.

Another of the proposed techniques uses a decimated version of the moving average filter to detect and correct errors in the recursive structure. Although this technique provides a lower protection than the first one it can be of interest in applications in which isolated errors are acceptable and the cost is a critical factor.

Innovative aspects

Enables an efficient protection of digital filter that in many situations will outperform existing techniques.

Competitive advantages

Reduces implementation area and power consumption that in turn reduces costs. This solution provides both an effective protection against radiation and a competitive implementation cost in terms of area and power, those result in substantial cost savings when compared with traditional techniques such as Triple Modular Redundancy (TMR).

Current state of intellectual property : Patent applied

Keywords

Electronic components; Circuits boards; Other electronics related.

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